Deprecation of BGP Entropy Label Capability Attribute

Abstract

   The BGP Entropy Label Capability attribute is defined in RFC 6790.
   Regrettably, it has a bug: although RFC 6790 mandates that routers
   incapable of processing Entropy Labels must remove the attribute,
   fulfillment of this requirement cannot be guaranteed in practice.
   This specification deprecates the attribute. A forthcoming document
   will propose a replacement.

Status of This Memo

   This is an Internet Standards Track document.

   This document is a product of the Internet Engineering Task Force
   (IETF). It represents the consensus of the IETF community. It has
   received public review and has been approved for publication by the
   Internet Engineering Steering Group (IESG). Further information on
   Internet Standards is available in Section 2 of RFC 5741.

   Information about the current status of this document, any errata,
   and how to provide feedback on it may be obtained at
   http://www.rfc-editor.org/info/rfc7447.

Table of Contents

1. Introduction

   [RFC6790] defines the Entropy Label Capability attribute (ELCA), an
   optional, transitive BGP path attribute. For correct operation, an
   intermediate node modifying the next hop of a route must remove the
   ELCA unless the node doing so is able to process entropy labels.
   Sadly, this requirement cannot be fulfilled with the ELCA as
   specified, because it is an optional, transitive attribute. By
   definition, a node that does not support the ELCA will propagate the
   attribute (this is a general property of optional, transitive
   attributes; see [RFC4271]). But such an ELCA-oblivious node is
   likely to be incapable of processing entropy labels and is exactly
   the node that we desire to remove the attribute!

   This specification updates RFC 6790 by deprecating the version of
   ELCA defined in Section 5.2 of that document. A forthcoming document
   will propose a replacement. All other sections of RFC 6790 are
   unchanged.

1.1. Requirements Language

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in RFC 2119 [RFC2119].

2. Deprecation of ELCA

   This document deprecates the ELCA path attribute. This means that
   implementations MUST NOT generate the attribute. If received, the
   attribute MUST be treated as any other unrecognized optional,
   transitive attribute as per [RFC4271], until and unless the code
   point is reused by some new specification. (To the authors' best
   knowledge, there are no implementations of ELCA at the time of
   writing.)

3. IANA Considerations

   For the reasons given in Section 1, IANA has marked attribute 28 "BGP
   Entropy Label Capability Attribute" in the "BGP Path Attributes"
   registry as "deprecated" and has added a reference to this RFC.

4. Security Considerations

   ELCA, as defined in Section 5.2 of [RFC6790], has in common with
   other optional, transitive path attributes the property that it will
   be "tunneled" through intervening routers that don't implement the
   relevant specification. Unfortunately, as discussed elsewhere in
   this document, implementations of ELCA that receive such "tunneled"
   attributes could -- sometimes improperly -- rely on them. The
   consequence of doing so could be a black hole in the forwarding path
   for the affected routes. Whether or not this is a new security issue
   is somewhat debatable, since an attacker would have to be part of the
   control-plane path for the route in question in order for the
   attacker to exploit the issue. Under those circumstances, an
   attacker already has a panoply of mischief-making tools available, as
   discussed in [RFC4272].

   In any case, this document renders any real or imagined security
   issues with ELCA moot, by deprecating it.

5. References

5.1. Normative References

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
              Requirement Levels", BCP 14, RFC 2119, March 1997,
              <http://www.rfc-editor.org/info/rfc2119>.

   [RFC6790] Kompella, K., Drake, J., Amante, S., Henderickx, W., and
              L. Yong, "The Use of Entropy Labels in MPLS Forwarding",
              RFC 6790, November 2012,
              <http://www.rfc-editor.org/info/rfc6790>.

5.2. Informative References

   [RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A
              Border Gateway Protocol 4 (BGP-4)", RFC 4271, January
              2006, <http://www.rfc-editor.org/info/rfc4271>.

   [RFC4272] Murphy, S., "BGP Security Vulnerabilities Analysis", RFC
              4272, January 2006,
              <http://www.rfc-editor.org/info/rfc4272>.

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